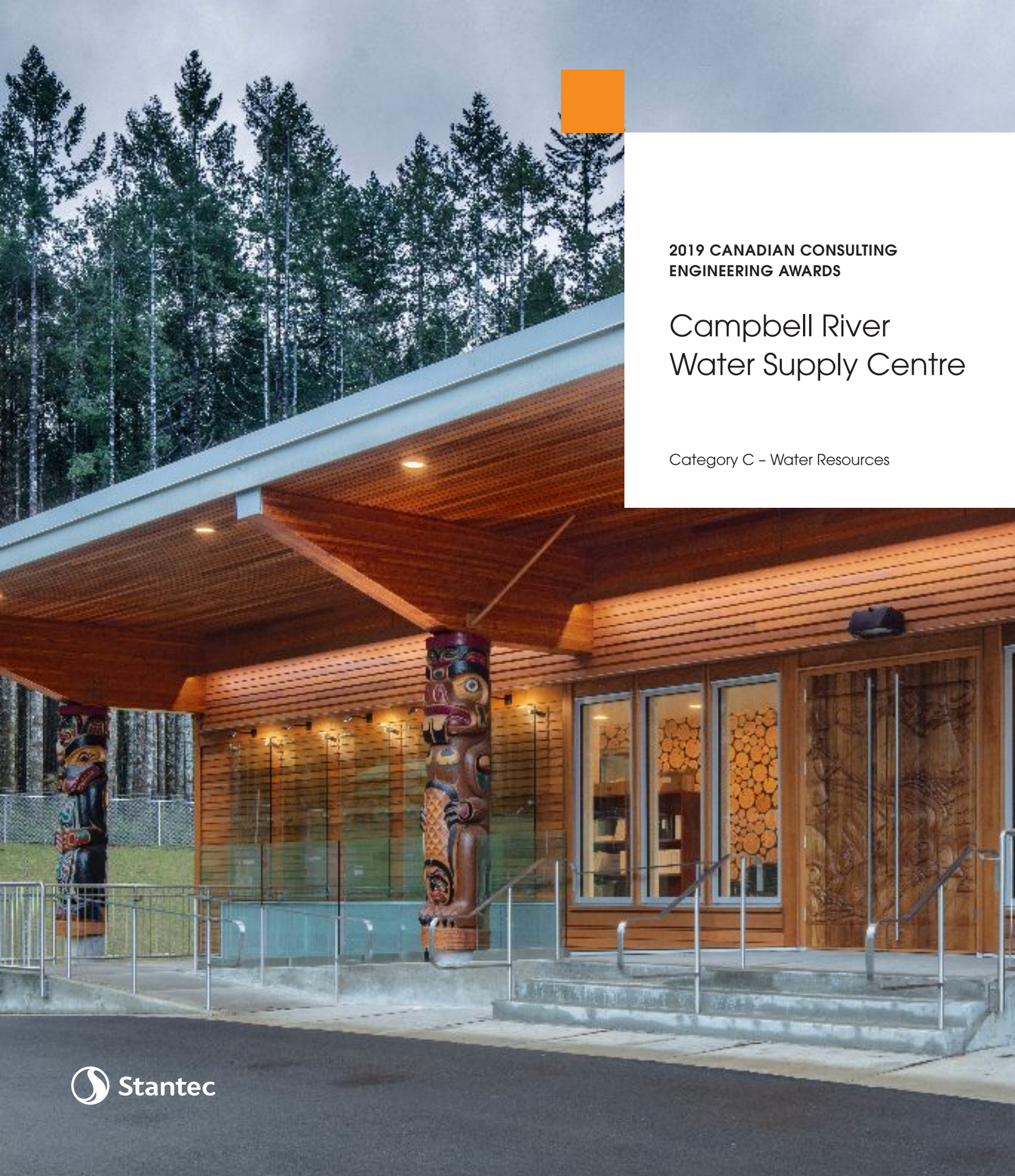

2019 CANADIAN CONSULTING ENGINEERING AWARDS

Campbell River Water Supply Centre

Category C – Water Resources

Stantec

Campbell River Water Supply Centre

Stantec was retained to design and project manage the construction of two major water infrastructure components crucial to the City of Campbell River: 1) a 3.5km long and 1200mm diameter steel water transmission line installed on Highway 28, connecting John Hart Lake to the city; and 2) a new facility housing vertical turbine pumps, and water treatment components. This is now known as the Campbell River Water Supply Centre.

Project Highlights

Q.1 INNOVATION

With the decommission of the existing BC Hydro penstocks due to the BC Hydro John Hart Redevelopment Project, the City of Campbell River was required to look for an alternative water supply distribution system for city residents. Thus, Stantec was retained to design and project manage the construction of two major water infrastructure components crucial to the City's needs: 1) a 3.5km long and 1200mm diameter steel water transmission line installed on Highway 28, which connected John Hart Lake to the city; and 2) a new facility—the Campbell River Water Supply Centre—housing the following components:

- The pump station equipment including motors, valving, and process piping.
- A UV disinfection system, which is the City's primary disinfection method and consists of 3 reactors; one new, and 2 relocated from the existing Elk Falls Water Quality Centre (EFWQC) following the commissioning of the new reactor.
- An Onsite Sodium Hypochlorite Generating Station (OSHGS). This is the City's secondary treatment method.
- Compressed air system to scour and clean the intake pipe screen.

The project highlights the use of a wet retrieval micro-tunneling approach, where a remotely controlled Micro-Tunneling Boring Machine (MBTM) is used to install pipes underground. The MBTM we used was specifically modified for this requirement, and was floated to the surface, and collected by boat after the micro-tunneling procedure was complete. Sites with a significant amount of ground water requires high-level of detail and skill when it comes to micro-tunneling, which proved to be a unique challenge for our teams and contractors involved. Although not new, microtunneling is still looked upon as an innovative approach, given its capacity to allow equipment to be installed in unreachable areas, and ability to be controlled remotely.

In addition, the construction of an approximately 15-meter deep concrete shaft i.e. the caisson, is an exemplary accomplishment, particularly given the proximity of the lake and the environmental constraints posed on the project as a result of the proximity of the intake to the City's potable water supply to the project site. The caisson was designed assuming a "sinking caisson" method would be used as the construction method, but the contractor opted to use a secant pile method so Stantec worked with the project team to make the design modifications required.

The project proved to be a massive feat and accomplishment for Stantec's engineers given the ever-growing scope-in fact, the projects fees progressed from the original ~400K contract to over $2.5 million, spanning over four years in duration.

UV disinfection system

Q.2 COMPLEXITY

Trying to design and construct a water-supply facility from John Hart Lake to the City was a challenge due to the topography of the land surrounding the lake, and the unpredictable nature of ground conditions. Thus, the initial plan to bore through the hillside by trenchless construction to implement a gravity system that connected John Hart Lake to the City was abandoned; the environmental implications to the surrounding area was too high. It was determined through the conducted risk assessment that pumping water from the lake would be the best approach.

As such, a transmission line was built along Highway 28 to accommodate the water flow from John Hart Lake, and initially indented to be connected to the City's existing Elk Falls Water Quality Centre (EFWQC), which was the City's previous primary disinfection facility. However, due to a high tender price for the piping along Surge Tower Road to connect to the EFWQC, the consensus was to incorporate the City's disinfection systems into the design of the new pump station–which would become the Campbell River Water Supply Centre–resulting in the EFWQC being decommissioned. The UV reactors from the EFWQC were relocated to the CRWSC as the reactors are less than 15 years old and have significant useable life left.

Because of how close construction was to the lake, a significant amount of effort was put in to mitigate risks, especially in terms of environmental impact.

15.2m deep caisson to accomodate the vertical turbine pumps and shafts

STANTEC | Campbell River Water Supply Centre, British Columbia

Q.3 SOCIAL AND/OR ECONOMIC BENEFITS

As the primary source of water for the city, the Campbell River Water Supply Centre is a state-of-the-art facility that captures the collaboration between engineers, architects, operators, government entities, and First Nation communities. With a viewing room built inside the space, the Supply Centre also provides societal benefits in terms of educating the public about how a crucial piece of infrastructure works.

As an integral part of the City's water infrastructure, the Campbell River Water Supply Centre was designed to properly blend with the existing landscape surrounding John Hart Lake, and to respect the historic land claims of the Wei Wai Kum First Nation band, who were active partners throughout the realization of this project.

The Campbell River Water Supply Centre project continues to illustrate the importance of engineering in our world. How we innovatively think outside the box to solve problems; and how to tackle those problems through the implementation of designs that benefit and sustain communities for many years to come. And for the people of Campbell River, that engineering benefit we've been able to achieve is the provision of water.

The lobby of the centre, with a built-in viewing room that provides visitors an opportunity to watch the b ehind-the-scene operations of their water source

Q.4 ENVIRONMENTAL BENEFITS

The exterior design of the Campbell River Water Supply Centre, which was a collaboration between Stantec, the City, and the Wei Wai Kum First Nation band

Stantec prepared an Environmental Protection Plan (EPP) prior to construction which was required to befollowed closely by the contractor during construction. The contractor was also required to retain a Qualified Environmental Professional (QEP) to ensure compliance with the requirements of the contract, including turbidity monitoring in the lake and around the previous intake location to ensure public health was not impacted by the project through potentially drinking turbid water from construction activities.

The pipeline alignment was designed to limit tree removal by locating the pipeline along the none-treeshoulder of Highway 28, and by aligning the pipe down Brewster Lake Road paved surface as opposed to locating the pipeline off the roadway and incurring additional tree removal. The equipment installed in the Water Supply Centre is designed to provide clean drinking water to the City for the next 50 years and has provisions in the design to allow for additional pumping and disinfection infrastructure to increase the flow capacity of the Water Supply Centre.

STANTEC | Campbell River Water Supply Centre, British Columbia

Q.5 MEETING CLIENT'S NEEDS

The Campbell River Water Supply Centre satisfies the City of Campbell River's needs and goals of finding an alternative and sustainable water source for the Campbell River community.

Significant funding was provided for this project, and thus it was of interest to all stakeholders to remain within the project schedule and budget. Therefore, the project was broken down into two phases to streamline efforts:

- Phase 1 was defined as the work on Highway 28 within Ministry of Transportation and Infrastructure property, where a 1,200 mm diameter steel pipe was installed to accommodate the water flow.
- Phase 2 was defined as the work within BC Parks and BC Hydro property adjacent to John Hart Lake, which eventually led to the design and construction of the Campbell River Water Supply Centre.

Transforming an industrial building into an iconic design and educational landmark was part of the City's goals, which lead to a built-in view room and a social space to encourage learning within the community about the workings of a crucial infrastructural piece.

Vertical turbine pumps